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Researching special populations: retention of Latino gay and bisexual men and transgender persons in longitudinal health research

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Abstract

Few studies have sought to assess predictors of retention of racial/ethnic or sexual minorities in longitudinal health research. The purpose of this study is to investigate predictors of retention of Latino gay and bisexual men and transgender (GBT) research participants after the baseline interview. Data come from a sample of 643 Latino GBT individuals in two cities (Chicago and San Francisco). We assessed potential predictors of retention (operationalized as successful re-contact) using binary logistic regression of retention on five factors (sociodemographic/health, residential stability, acculturation/attachment to the United States, gay community attachment/stigmatization and research process/design). Our overall follow-up rate was 83 and 80% at 3 and 6 months, respectively. We found that traditional factors (e.g. education, income) were not associated with retention among Latino GBT. The strongest predictors of successful retention were the number of pieces of contact information provided by participants and city of residence (San Francisco). Furthermore, successful methods of contact (i.e. telephone, email) varied by city. We conclude that a largely immigrant urban population of Latino GBT individuals can be successfully followed in longitudinal research. The strong relationship between study design variables and successful retention indicates that collection of thorough contact information is vital to successful follow-up with this population.

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Introduction

Retaining research participants over time is a major concern in longitudinal or panel surveys. Nonrandom attrition of participants from subsequent waves of data collection can bias findings and diminish sample power, undermining both internal and external validity [1, 2]. However, little is known about loss to follow-up among ethnic and sexual minorities specifically [3–5]. Latinos in the United States, particularly immigrants, may be more often lost to follow-up because of high mobility and residential instability [6, 7], fear of or avoidance of contact with unfamiliar institutions or incongruence between the language and culture of the survey institution and their own [3, 4, 8].

The lack of information on retention of Latinos in health research contrasts with growing interest in Latino health. The explosive growth of the Latino population in the United States (increase of 61% since 1990; [9]), the diversity of the population (e.g. by country of origin, race, level of acculturation) and unusual patterns of risk and resilience to disease and illness (e.g. the 'Latino paradox'; [10–12]) have driven this surge in Latino-focused health research.

Latino gay and bisexual men and transgender (GBT) persons (male-to-female) form part of this diverse population and have been the focus of recent health research due to disproportionate rates of

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HIV/AIDS-related mortality and morbidity [13–17]. In addition to traditional factors influencing retention (e.g. sociodemographic, residential stability/mobility), Latino GBT may be lost to follow-up in HIV-related research due to the stigmatization associated with homosexuality and gender non-conforming behavior (and the relationship between HIV/AIDS and homosexuality).

Correlates of attrition

Studies of participation in longitudinal research suggest that sociodemographic characteristics [3, 18–20], community attachment [18], life instability (high mobility or residential instability) [18, 2, 20] and substance use [21–23] are associated with attrition from subsequent waves of data collection (beyond the baseline interview). In national probability samples of the US adult population, successful location and re-contact of participants was positively associated with age, gender (i.e. female), education, satisfaction with employment and attachment to the community; and negatively associated with being African-American [18–20]. In addition, high mobility and/or residential instability (e.g. renting one's home) are negatively associated with retention [18, 20]. Furthermore, substance use has been found to be associated with loss to follow-up [21–23].

Unfortunately, very few studies have examined retention or attrition among Latinos. In a review of 20 US panel studies comparing rates of attrition by race/ethnicity, Johnson *et al*. [3] found that the majority of studies (i.e. 85%) reported greater attrition among minority groups than among non-Hispanic Whites. Seven of these studies reported lower rates of re-contact, location (e.g. verifying re-contact information without making contact) or cooperation among Latinos (or Mexican Americans) compared with Whites.

Similarly to the US population at large, sociodemographic factors, community attachment and residential instability may also influence attrition among Latinos. They are more likely to be younger and have lower levels of education than the general US population [9], both of which are positively associated with attrition. Latinos are also more geographically mobile than other racial/ethnic groups, particularly with regard to international movement [6, 7], which may impact their attachment to local communities, as well as the ability of research staff to locate them. Also, greater attrition among Latinos may be due to a discord between the survey process and the values, norms and practices in this population [3, 4, 8].

The discord between the research process and the values of participants reflects the inherently social nature of survey research [24]; social and cultural influences on behavior are important aspects of variation in response to research across groups. Johnson and colleagues [3] delineate specific values and orientations which underlie culture and which provide insight into the potential reasons for non-response. Variation in the emphasis placed on personal versus group interests (i.e. collectivism versus individualism), the degree to which social groups hold power over one another (power distance), emphasis on vertical versus horizontal social relationships and communication styles (e.g. context, non-verbal behavior, self-disclosure) may all play a role in research participation and retention [3]. Thus, Latinos in the United States, who tend to be collectivist in orientation [25], may view 'outgroups' (i.e. non-Latinos) with suspicion, including survey organizations [3], and therefore be less likely to participate or maintain contact.

The limited research available on GBT participation in HIV research indicates that younger age, lower income, racial minority status, substance use and having a less public gay identity are associated with loss to follow-up [26–28]. Thus, similarly to the studies cited above, sociodemographic factors impact participation in HIV-related research among gay men. In addition, internalized stigma may prevent gay men from initial or subsequent participation in this research. Given the role of community attachment in retention, it follows that gay community attachment may also be associated with successful follow-up of GBT individuals.

Finally, the frequency of data collection, the time between points of data collection and the number of waves of data collection may influence rates of successful follow-up [18]. In addition, thorough

tracking information (including names of friends, significant others and family members) and placing emphasis on the importance of tracking with research staff are also key strategies for obtaining adequate retention [2].

Thus, based on this review of the existing literature, we assess the contribution of five factors to successful retention of Latino GBT for research beyond the baseline interview: sociodemographic/health characteristics, residential stability, acculturation/attachment to the United States, gay community attachment and stigmatization and the research process and design. Retention is operationalized here as successful re-contact of participants at 3 and 6 months after the baseline interview.

Methods

This study forms part of a larger investigation of sexual risk behavior among Latino GBT in Chicago and San Francisco. Data collection took place from June through November of 2004 at the University of Illinois at Chicago, located just west of downtown Chicago and at the César E. Chávez Institute of San Francisco State University, located in the Mission District in San Francisco. Follow-up contacts were attempted at 3 and 6 months following the initial date of interview. We chose these two cities because they allow for a comparison of differences in the social and cultural contexts. While both cities have large Latino [9] and Latino gay populations [29], the gay community is more visible in San Francisco, with a longer history of gay community activism [30], as well as a higher rate of HIV/AIDS [31].

Sample

The sample consisted of 643 individuals (n = 320 in Chicago; n = 323 in San Francisco), aged 18–73, all of whom self-identified as Latino, gay or bisexual and as men or transgender (male-to-female). We recruited participants through respondent driven sampling (RDS), a social network referral method [32, 33]. Details of the sampling and recruitment procedures are described elsewhere [34]. RDS was designed specifically for use with 'hidden' populations, for which no sampling frame is available. It has the potential to reach individuals who might not otherwise participate in studies using other sampling methods (e.g. venue-based or random-digit-dialing methods) because it relies on social networks for recruitment. All participants received $50 for taking the survey and received a $20 incentive for each peer recruited (up to $60).

Data collection

All materials and correspondence associated with data collection (e.g. recruitment materials, screening forms, orientation procedure, consent process and survey) were created in both Spanish and English and were utilized by fully bilingual research staff. All communication with potential participants was conducted in their preferred language. Participants were welcomed to the project, introduced to project staff, offered refreshments and made comfortable to enhance their experience with the research process and encourage continued contact with the project. All participants provided their full name and any nicknames or aliases, as well as a minimum of two forms of contact information (e.g. home address, phone/pager numbers, email addresses, telephone numbers for friends, relatives or social service staff).

At 3 and 6 months following the initial interview, research staff began attempts to contact participants. No data, other than verification of current contact information, were recorded at the follow-up contacts. Four attempts were made to contact participants (not including unanswered calls, wrong numbers or email or letters returned as undeliverable) using different methods of contact over the course of 4 weeks (to allow enough time for returned calls or correspondence).

Baseline survey data were collected using computer-assisted self-interviewing software. Of 734 individuals who were eligible for the study (verified through screening), 649 (88%) participated in the survey. A total of six of 649 interviews were incomplete or contained systematically invalid data, thus the final sample size was 643.

Measures

Retention

Our main dependent variable was operationalized as re-contact (i.e. not a second interview) at (i) 3 months and (ii) 6 months post-baseline interview (1 = contact, 0 = no contact). A successful contact was recorded for the participant if research staff made direct (e.g. telephone) or indirect (e.g. receipt of a voicemail message, email message or mail) contact with the participant (in response to a message from the project).

Demographic variables, HIV status and substance use

Demographic variables included age, annual income, education, employment and city (i.e. Chicago and San Francisco). Age was coded into four ordinal categories from youngest to oldest (1 = 18–29, 2 = 30–39, 3 = 40–49 and 4 = ⩾50). Annual income was coded into five ordinal categories from low to high (1 = <$10 000, 2 = $10 000–$19 999, 3 = $20 000–$29 999, 4 = $30 000–$39 999 and 5 = ⩾$40 000). Participants' highest level of formal education was coded into five ordinal categories from low to high (1 = less than high school, 2 = high school diploma/GED, 3 = some college, technical/vocational school, 4 = college degree and 5 = graduate degree). Dummy variables were created for city (San Francisco = 0 and Chicago = 1) and for employment, with less than full-time employment as the reference group (0 = less than full time and 1 = full time). Individuals who were employed part time were grouped with the unemployed, as 'less than full time' because we reasoned that both groups would have more time to respond to follow-up requests compared with those employed full time. This reasoning was supported by the data. In bivariate analysis, both groups were slightly more likely to be re-contacted at both time periods compared with those who were employed full time.

Two dummy variables were created to reflect HIV status (with HIV negative as the reference group in each case; 0 = HIV negative, 1 = HIV positive; 0 = HIV negative, 1 = not tested/unknown). Two variables were created to measure substance use in the last 6 months: heavy alcohol use (0 = less than six drinks on an average drinking day and 1 = six drinks or more on an average drinking day) and drug use (0 = no drug use and 1 = any use of speed, powder cocaine, crack, marijuana, poppers, ecstasy, GHB, ketamine or heroin).

Residential stability

Two variables were used to indicate residential stability: the length of time living in the area (Chicagoland or San Francisco Bay) in years and current relationship status (with someone they consider a boyfriend, partner or lover; 0 = not in a relationship and 1 = in a relationship). Because of the skewed distribution of time in the area, it was divided into quartiles for analysis from the shortest to the longest number of years in the area (1 = ⩽year, 2 = 2–5 years, 3 = 6–16 years and 4 = ⩾17 years).

Acculturation and attachment to the United States

To measure acculturation and attachment to the United States, we used two variables, the language in which the interview was completed by the participant (0 = Spanish and 1 = English) and the degree of attachment felt to the United States (i.e. 'How strongly do you feel a part of the United States society and culture?'), with a four-point Likert response scale ranging from 1 = not at all to 4 = very strongly.

Gay community attachment and stigmatization

Community attachment was measured using three variables: social attachment, sense of community and social network size. The social attachment scale is the average of 13 items ($\alpha = 0.82$), which refer to frequency of participation in GBT groups and organizations (e.g. support groups, professional organizations and social groups) and use of GBT media (i.e. gay magazines and newspapers) in the previous 12 months. A sample item is, 'During the past 12 months, how often have you participated in gay charity events or community service organizations?' Responses were recorded on a six-point frequency scale from 1 = never to 6 = more than once

a week [mean = 2.5, standard deviation (SD) = 0.85]. The sense of community scale contains seven items ($\alpha = 0.87$) indicating a feeling of membership and shared connection with others in the local gay community. A sample item is, 'I feel part of the gay community in my city'. Responses were recorded on a four-point agreement scale from 1 = strongly disagree to 4 = strongly agree (mean = 3.3, SD = 0.54). The item measuring social network size reflects the number of GBT Latino that form part of each individual's social network, self-reported by respondents in open-ended format. Because of the skewed distribution of this variable, it was divided into quartiles for analysis from small to large network size (1 = 0–4, 2 = 5–9, 3 = 10–22 and 4 = ⩾23.).

Stigma regarding homosexuality was divided into three dimensions: perceived, experienced and internalized stigma. The perceived stigma scale contains 17 items ($\alpha = 0.95$), which reflect the perception of stigma in the wider society (e.g. 'Most families would be disappointed to have a gay son'). Responses were rated on a four-point agreement scale ranging from 1 = strongly disagree to 4 = strongly agree (mean = 2.8, SD = 0.72). The experienced stigma scale contains 20 items ($\alpha = 0.91$) reflecting the exposure to or experience of negative attitudes and beliefs, discrimination or prejudice [e.g. 'As an adult, how often have you been made fun of or called names (faggot, queer, sissy) because of your sexual orientation?']. Responses were rated on a four-point frequency scale ranging from 1 = never to 4 = many times (mean = 2.13, SD = 0.65). The internalized stigma scale contains 17 items ($\alpha = 0.88$) which reflect stigmatized (gay) individuals' own acceptance of negative attitudes and beliefs held by the larger society (e.g. 'Sometimes I wish I were not gay'). Responses were rated on a four-point agreement scale from 1 = strongly disagree to 4 = strongly agree (mean = 2.0, SD = 0.57).

Research process and design

We assessed the total number of pieces of contact information provided by the participant (e.g. home address, telephone numbers, email address; names and phone numbers of friends, relatives, boyfriends; range 1–8) and the number of each participant's peers who participated in the project (i.e. the number of a participant's recruitment coupons redeemed; range 0–3).

Data analysis

Two separate hierarchical logistic regression models were computed for each dependent variable (i.e. contact at 3 months and contact at 6 months), to compare characteristics of contacted versus non-contacted participants. This analysis may result in a bias toward the null hypothesis due to the repeated measurement of re-contact. Thus, we ran an additional analysis using multinomial logistic regression of partial (once) and complete (twice) re-contact (reference group was no contact) on the same set of predictors. The results of this additional analysis were essentially the same as those reported here; thus, findings from the more simple set of analysis are presented.

All five sets of variables were entered into each of the two hierarchical logistic regression models in successive steps. Because the project process and design variables are conceptually the most proximal to the outcome variables (i.e. contact at follow-up), we entered these variables in the first step of each model, followed in sequence by sociodemographic and health, residential instability, acculturation/attachment to the United States and gay community attachment and stigmatization. We used unweighted data in this analysis. While we cannot assume that our sample is self-weighting because characteristics associated with participation (e.g. network size, recruitment effectiveness) may also be associated with study variables (e.g. income, education, HIV status), the variables which define the weights are included in the models and, thus, are controlled for in the analysis [35].

Results

The study sample of Latino GBT was evenly divided between the two cities by design (50% San Francisco and 50% Chicago) (see Table I). The

Table I. *Demographic characteristics of Latino GBT in San Francisco and Chicago, 2004 (n = 643)*

Characteristics	Chicago, n = 320 (%)	San Francisco, n = 323 (%)	Total, N = 643 (%)
Age			
18–29	126 (39)	76 (23)	202 (31)
30–39	113 (35)	127 (39)	240 (37)
40–49	55 (17)	89 (28)	144 (23)
⩾50	26 (8)	31 (10)	57 (9)
Education			
Less than high school	81 (25)	91 (28)	172 (27)
High school/GED	88 (28)	61 (19)	149 (23)
Some college/technical/vocational	106 (33)	111 (34)	217 (34)
College degree	35 (11)	51 (16)	86 (13)
Graduate degree	10 (3)	9 (3)	19 (3)
Employment status[a]			
Full time	156 (49)	85 (26)	241 (38)
Part time/unemployed/other	164 (51)	236 (74)	400 (62)
Annual income			
<10 000	95 (30)	165 (51)	260 (40)
10 000–19 999	108 (34)	64 (20)	172 (27)
20 000–29 999	70 (22)	50 (15)	120 (19)
30 000–39 999	34 (11)	28 (9)	62 (10)
⩾40 000	13 (4)	16 (5)	29 (4)
Place of birth			
United States	99 (31)	46 (14)	145 (23)
Mexico	141 (44)	158 (49)	299 (47)
Puerto Rico	27 (8)	7 (2)	34 (5)
Central America	13 (4)	59 (18)	72 (11)
South America	30 (9)	36 (11)	66 (10)
Other	10 (3)	17 (5)	27 (4)
HIV status			
Positive	57 (18)	113 (35)	170 (26)
Negative	208 (65)	184 (57)	392 (61)
Not tested/don't know/refused	55 (17)	26 (8)	81 (13)

[a]Two cases were deleted due to conflicting employment information.

mean age of participants was 35, with the largest percentage of participants (37%) in their 30s (age range 18–73). Participants were relatively well educated with 73% having at least a high school diploma (or equivalent). However, employment and income were low with only 38% of participants working full time and 67% of participants earning less than $20 000 annually. Most participants (77%) were born outside the United States, with the largest percentage, 47%, born in Mexico. In addition, almost a third of participants (26%) reported being HIV positive. When comparing those who were lost to follow-up to those who were retained at each time period, city was the only significant difference found. Participants in San Francisco were more likely to be retained at both time periods (3 months $\chi^2 = 9$, df = 1, $P \leqslant 0.01$, at 6 months $\chi^2 = 7$, df = 1, $P \leqslant 0.01$).

The overall re-contact rate at 3 months was 83% (n = 535) and at 6 months was 80% (n = 512) (see Table II). The re-contact rate was higher in San Francisco during both periods with an 88% rate at 3 months versus 79% in Chicago and an 84% follow-up rate at 6 months versus 75% in Chicago. In Chicago, at 3 and 6 months, the dominant method of contact was by telephone (87 and 94%,

Table II. *Contact rate and method of contact at 3 and 6 months by city among Latino GBT*

	Chicago, n = 320 (%)	San Francisco, n = 323 (%)	Total, N = 643 (%)
3 months post-interview	252 (79)	283 (88)	535 (83)
Telephone	219 (87)	115 (40)	334 (62)
Email	11 (4)	93 (33)	104 (20)
In person	13 (5)	57 (20)	70 (13)
Surrogate	0 (0)	17 (6)	17 (3)
Mail	9 (4)	1 (<1)	10 (2)
6 months post-interview	241 (75)	271 (84)	512 (80)
Telephone	227 (94)	116 (43)	343 (67)
Email	8 (3)	100 (37)	108 (21)
In person	1 (<1)	26 (9)	27 (5)
Surrogate	4 (2)	29 (11)	33 (6)
Mail	1 (<1)	0 (0)	1 (<1)

respectively). In San Francisco, the largest percentage of successful contacts at 3 and at 6 months were also made by telephone (40% at 3 months and 43% at 6 months); however, >30% of contacts were made in each period by email and a large percentage were also made in person in both periods (20% at 3 months and 9% at 6 months), compared with Chicago.

The analysis of variables associated with successful contact at 3 months demonstrates that overall, research design variables, city and language of interview are the strongest predictors (see Table III). Because of the significant association of city with re-contact, we also tested the interaction of city with all other study variables. We found that only time in the area significantly interacted with city to predict re-contact. At 3 months post-baseline, research design variables were associated with re-contact in steps 1–4 of the model; however, only contact information remained significantly associated with the outcome in the full model, step 6, with the coefficient for this variable increasing in successive steps of the model [B = 0.636, standard error (SE) = 0.122, $P < 0.05$]. City was the only demographic variable associated with successful re-contact in steps 1–6 of the model, with participants from Chicago less likely to be successfully re-contacted at 3 months. In the full model, city interacted with time living in the area (B = 0.507, SE = 0.221, $P < 0.05$). *Post hoc* analysis of this interaction showed that participants in Chicago with more time in the area were significantly more likely to be re-contacted than those with less time in the area. In the full model, one indicator of acculturation, language of interview, was significantly associated with re-contact. English speakers were less likely to be contacted than Spanish speakers (B = −0.595, SE = 0.285, $P < 0.05$). Neither gay community attachment (i.e. social attachment, sense of community, network size) nor gay-related stigma was related to re-contact at 3 months.

Table IV depicts results of the logistic regression predicting re-contact at 6 months. Similarly to re-contact at 3 months, successful contact was associated with research design and city (see Table IV). Again we tested interactions between city and all study variables but found no significant interactions in the final model. In the full model, the number of pieces of contact information provided by participants was significantly and positively related to successful re-contact, and the coefficient increased in successive steps of the model (B = 0.713, SE = 116, $P < 0.05$); city was predictive of the successful re-contact in all steps of the model, with participants from Chicago less likely to be re-contacted. Moreover, substance use in the previous 6 months was significantly and positively associated with successful re-contact in the final model (B = 0.545, SE = 0.243, $P < 0.05$). Also, relationship status was a significant predictor of re-contact (B = −0.485, SE = 0.219, $P < 0.05$), with those currently in relationships less likely to be successfully re-contacted. Sociodemographic variables, HIV status, acculturation and attachment and gay-related variables were not significantly associated with re-contact at 6 months.

Discussion

Longitudinal research designs are necessary to advance research on HIV and other health-related concerns among Latino GBT. The follow-up rate

Table III. *Hierarchical logistic regression analysis for variables predicting re-contact at 3 months (logit coefficients reported, standard errors in parentheses)*

Variable	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Process and design						
Pieces of contact information	0.504 (0.108)*	0.623 (0.119)*	0.623 (0.119)*	0.624 (0.120)*	0.625 (0.121)*	0.636 (0.122)*
Recruitment of peers	0.234 (0.104)*	0.241 (0.106)*	0.247 (0.107)*	0.229 (0.107)*	0.204 (0.108)	0.201 (0.108)
Demographics and health						
Age		−0.013 (0.129)	−0.027 (0.132)	−0.049 (0.132)	0.000 (0.137)	0.059 (0.141)
Income		−0.187 (0.117)	−0.196 (0.118)	−0.160 (0.120)	−0.184 (0.123)	−0.183 (0.124)
Education		0.019 (0.113)	0.017 (0.113)	0.058 (0.116)	0.038 (0.118)	0.063 (0.120)
Full-time employment		0.215 (0.269)	0.231 (0.270)	0.165 (0.275)	0.213 (0.280)	0.251 (0.281)
HIV status						
HIV positive		−0.049 (0.298)	−0.058 (0.299)	−0.084 (0.301)	−0.086 (0.309)	−0.040 (0.310)
HIV status unknown/untested		−0.265 (0.326)	−0.274 (0.326)	−0.214 (0.331)	−0.169 (0.335)	−0.157 (0.337)
Heavy alcohol use		−0.008 (0.264)	−0.019 (0.264)	−0.041 (0.266)	−0.054 (0.270)	−0.067 (0.271)
Drug use		0.230 (0.235)	0.232 (0.235)	0.360 (0.248)	0.391 (0.256)	0.399 (0.258)
Chicago		−0.912 (0.256)*	−0.931 (0.258)*	−0.881 (0.262)*	−0.838 (0.268)*	−2.082 (0.616)*
Residential stability						
Time in area			0.061 (0.104)	0.101 (0.108)	0.117 (0.110)	−0.212 (0.182)
Currently in a relationship			−0.072 (0.226)	−0.043 (0.228)	−0.011 (0.231)	0.016 (0.233)
Acculturation/attachment to the United States						
Interview in English				−0.498 (0.269)	−0.599 (0.283)*	−0.595 (0.285)*
Attachment to United States				0.118 (0.144)	0.090 (0.153)	0.042 (0.155)
Gay related						
Social attachment					0.245 (0.166)	0.246 (0.167)
Sense of community					0.076 (0.249)	0.106 (0.250)
Perceived stigma					0.300 (0.174)	0.305 (0.176)
Experienced stigma					−0.147 (0.207)	−0.153 (0.208)
Internalized stigma					−0.008 (0.220)	−0.022 (0.221)
Gay network size					−0.036 (0.112)	−0.041 (0.113)
Interactions						
City × time in the area						0.507 (0.221)*
Nagelkerke R^2	0.080	0.131	0.132	0.142	0.155	0.169
Model χ^2 (df)	30.00 (2)*	50.13 (11)*	50.57 (13)*	54.53 (15)*	60.06 (21)*	65.40 (22)*

*$P \leqslant 05$.

Table IV. *Hierarchical logistic regression analysis for variables predicting re-contact at 6 months (logit coefficients reported, standard errors in parentheses)*

Variable	Step 1	Step 2	Step 3	Step 4	Step 5
Design and process					
Pieces of contact information	0.577 (0.104)*	0.689 (0.113)*	0.707 (0.114)*	0.706 (0.114)*	0.713 (0.116)*
Recruitment of peers	0.161 (0.095)	0.186 (0.097)	0.204 (0.098)*	0.193 (0.099)*	0.176 (0.101)
Demographics and health					
Age		−0.137 (0.120)	−0.147 (0.124)	−0.159 (0.124)	−0.147 (0.129)
Income		0.002 (0.111)	0.002 (0.113)	0.026 (0.116)	0.023 (0.117)
Education		−0.004 (0.105)	−0.013 (0.106)	0.007 (0.108)	0.029 (0.109)
Full-time employment		−0.026 (0.253)	−0.016 (0.255)	−0.057 (0.259)	−0.063 (0.263)
HIV status					
HIV positive		0.306 (0.284)	0.261 (0.285)	0.252 (0.286)	0.169 (0.292)
HIV status unknown/untested		0.153 (0.321)	0.121 (0.322)	0.157 (0.325)	0.230 (0.331)
Heavy alcohol use		−0.260 (0.244)	−0.282 (0.245)	−0.299 (0.246)	−0.304 (0.250)
Illicit drug use		0.424 (0.224)	0.440 (0.225)	0.514 (0.236)*	0.545 (0.243)*
Chicago		−0.834 (0.239)*	−0.869 (0.243)*	−0.834 (0.246)*	−0.794 (0.254)*
Residential stability					
Time in area			0.032 (0.098)	0.057 (0.102)	0.081 (0.104)
Currently in a relationship			−0.452 (0.215)	−0.441 (0.215)*	−0.485 (0.219)*
Acculturation/attachment to the United States					
Interview in English				−0.175 (0.242)	−0.130 (0.269)
Attachment to United States				0.077 (0.135)	−0.054 (0.145)
Gay related					
Social attachment					0.100 (0.154)
Sense of community					0.314 (0.232)
Perceived stigma					−0.306 (0.175)
Experienced stigma					0.030 (0.196)
Internalized stigma					−0.116 (0.205)
Gay network size					0.063 (0.106)
Nagelkerke R^2	0.095	0.147	0.158	0.161	0.181
Model χ^2 (df)	38.56 (2)*	60.45 (11)*	65.07 (13)*	66.53 (15)*	75.24 (21)*

*$P \leqslant 0.05$.

achieved herein provides evidence that future longitudinal research with this population is feasible.

The findings of this study indicate that a follow-up rate of at least 80% at 3 and 6 months post-baseline is achievable among Latino GBT.

Traditional predictors of successful retention, such as higher levels of education and income, and older age are not associated with retention among Latino GBT. This may be due to less variation in these characteristics (i.e. the Latino population is poorer and younger than the population at large); hence, there are lower levels of power to detect differences among variables. Our incentives for participation, $50 for the initial interview and $20 for each referral (up to three referrals), may have helped to overcome a tendency for those of low socioeconomic status to be lost to follow-up. That is, while participants did not receive an incentive for responding to our re-contact attempts, those of lower socioeconomic status may have been motivated by the incentives to recruit additional participants. As well, those who referred more participants to the study had more contact with project staff, and thus, more opportunity to build rapport with staff. This may have led to greater re-contact rates among lower socioeconomic status participants than usually found in studies using non-network-based recruitment.

The most robust predictor of follow-up was the number of pieces of contact information provided by the participants. The project was designed to obtain at least two forms of contact information for each participant, including the name and telephone number of at least one friend or relative. Unfortunately, we could not analyze pieces of information separately to assess which ones (e.g. phone number, friend's contact information) were particularly effective. Our findings support previous research suggesting that accurate and complete contact information is an important aspect of good practice in longitudinal research and of successful retention [2].

Follow-up was more successful in San Francisco than in Chicago for both time periods, even after controlling for demographic and health variation, acculturation, residential stability and gay-related community attachment and stigma. This may be due to several factors, including the concentration of the urban space in San Francisco, compared with the relative sprawl of Chicago, the longer history and greater prevalence of HIV-related research in San Francisco (and thus familiarity with research among San Francisco participants) and the location of the data collection site in San Francisco in the heart of the Latino community and adjacent to the gay community (i.e. 16th Street and Mission Street).

The variation in methods of re-contact by city may also explain differential rates of follow-up. Whereas in Chicago participants did not often respond to email contact (although many provided email addresses), in San Francisco, this was a primary method of contact. The convenience of email and responsiveness to email by participants in San Francisco may be another reason for the higher rate of re-contact.

We also found that language of the interview, relationship status and substance use were associated with retention and varied over time but no clear patterns emerged. Spanish speakers were more likely to be retained at 3 months post-baseline, but not at 6 months. Those not in a relationship were more likely to be contacted at 6 months, but not at 3 months. In addition, those reporting drug use were more likely to be retained at 6 months, but not 3 months. Furthermore, in Chicago, at 3-month follow-up, a longer period of time living in the area was related to successful retention, but there were no significant effects for residential stability at the 6-month period.

These results are largely inconsistent with previous research. We did not anticipate that Spanish speakers would be more successfully retained. This may reflect our success in overcoming potential cultural barriers and making a connection with participants with a greater collectivist orientation. Furthermore, we anticipated that relationship status would reflect residential stability and, therefore, be predictive of retention. However, this assumption may not apply to a relatively young Latino GBT population. Those who are not in a relationship may have more time and availability for successful follow-up than those in a relationship. Finally, substance use was positively associated with retention, rather than negatively associated with it. This result may reflect the responsiveness of participants to us given the relatively high level of incentives offered for initial participation and peer recruitment (although participants were not paid for the brief re-contact) and the short time period before re-contact (i.e. 3 and 6 months). Thus, overall, the influences on successful retention of urban Latino GBT population may not conform to those of the gay men more generally or the population at large and are likely to vary by city of residence and through time.

This study has several limitations. Although the sample was gathered using a new and innovative method, RDS, the results may not be generalizable to other populations of Latino GBT in other cities or non-urban areas. The Latino populations in Chicago and San Francisco are dominated by those of Mexican descent. Different results may be found among Latinos of other nationalities. In addition, we did not inquire about previous participation in research or assess satisfaction with participation in our project. This would have enhanced our ability to assess the impact of project design on successful follow-up. Moreover, we did not measure dimensions of culture, such as collectivism versus

individualism, power distance, emphasis on vertical versus horizontal social relationships and communication styles; therefore, our assessment of the impact of culture on successful retention is limited. However, while we did not include these variables in our survey instrument, these concepts fundamentally influenced our approach to recruitment of and interaction with participants at all stages of the survey process. Attention to these factors allowed us to build rapport and trust with participants; thus, we emphasize their importance for the process of research, in addition to the instrumentation. Likewise, our study was designed to measure successful re-contact, not participation in a second wave of data collection. Follow-up rates for actual participation may be less than that for brief re-contact only. As well, for coding of the employment variable, we grouped those who were working part time together with those who were unemployed because we reasoned that they would have more time to respond to our re-contact attempts than those working full time, and because, in bivariate analysis, both groups were more likely to be re-contacted than those working full time at both contact periods. However, while we coded these two groups into one category (i.e. less than full-time employment), they may be quite different from each other and their reasons for responding to re-contact attempts may also differ. By grouping them together, we cannot discern separate effects for each group; this is a potential weakness of this study to be considered in future research. Finally, our study was designed to assess short-term follow-up (i.e. 3–6 months post-baseline); however, studies of longer term follow-up (i.e. a year and more) would provide a more rigorous test of the feasibility of retention with this population. Future longitudinal research with Latino GBT should attend to these factors in study design to increase retention rates and avoid potential study bias.

Conclusion

This study provides evidence that a largely immigrant urban population of Latino GBT individuals can be successfully followed in longitudinal research. The strong relationship between study design variables and successful contact indicates that collection of thorough contact information is vital to successful follow-up with this population. In addition, the success of different methods of contact may vary substantially within this population, as it did here. Email and face-to-face contact played a larger role in successful follow-up in San Francisco compared with Chicago. Thus, special efforts may be necessary to retain participants in areas characterized by geographic dispersion and limited use of email. In addition, we recommend that future research attend to the underlying aspects of culture throughout the research process. Future follow-up research among Latino GBT can build on this study by measurement of such aspects of culture as collectivism, power distance and communication styles in relationship to follow-up success.

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Conflict of interest statement

None declared.

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